Trend Study 28-8-03

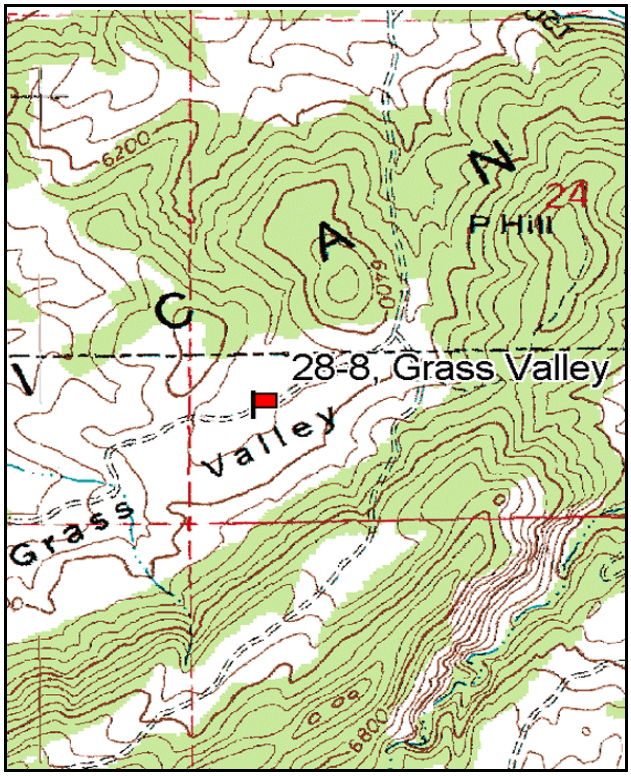
Study site name: Grass Valley . Vegetation type: Mountain Big Sagebrush .

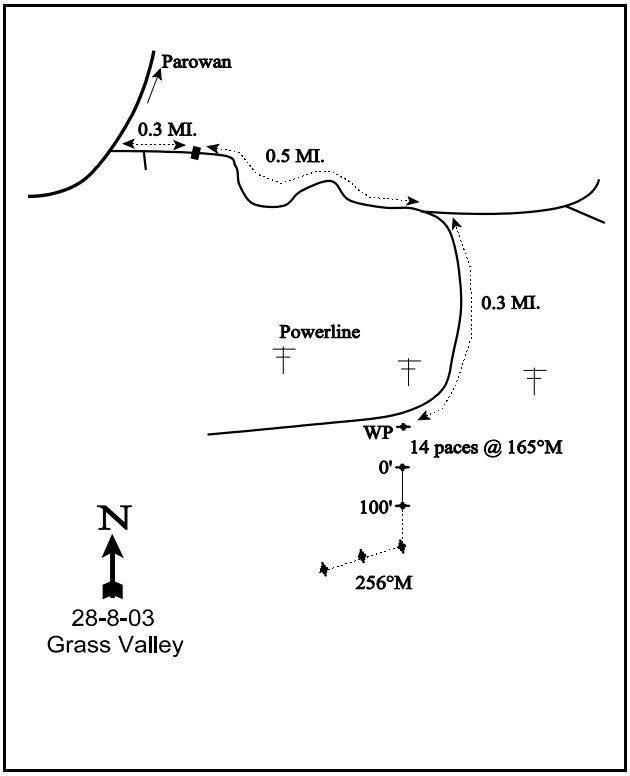
Compass bearing: frequency baseline 165 degrees magnetic. (Lines 3-4, 256° M degrees).

Frequency belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft).

LOCATION DESCRIPTION

From I-15 take the north Parowan exit south into town. Continue down Main Street to a big gradual curve on the south end of town. Turn east off the highway across from a log house onto a dirt road, go past other houses staying on the main road 0.3 miles to cattleguard. From the cattleguard, continue 0.5 miles to a fork. Bear right. Proceed 0.3 miles underneath the powerlines to a witness post on left side of the road. The baseline starts 68 feet away at a bearing of 165 degrees magnetic and is marked by 2 foot tall fenceposts with no browse tag.





Map Name: Parowan

Diagrammatic Sketch

Township 34S , Range 9W , Section 24

GPS: NAD 27, UTM 12S 4187913 N, 339118 E

DISCUSSION

Grass Valley - Trend Study No. 28-8

This trend study is located in the foothills south of Parowan. Elevation is approximately 6,400 feet with a northwest aspect and a gentle 5% slope. The site is surrounded by pinyon-juniper covered hills. Most of the valley was chained and seeded in the mid-1960's by the BLM. The site itself is dominated by mountain big sagebrush and seeded grasses and is considered critical deer winter range. A pellet group transect read in conjunction with the vegetative baseline in 1998 estimated 61 deer, 1 elk, and 9 cow days use/acre (151 ddu/ha, 3 edu/ha, and 22 cdu/ha). Pellet group transect data collected in 2003 estimated 57 deer, 1 elk, and 11 cow days use/acre (141 ddu/ha, 3 edu/ha, and 27 cdu/ha) on the site. There is a 3-way exclosure which was built in the late 1970's approximately 0.3 miles west of the site.

Soil textural and chemical analysis indicates a sandy loam with a slightly acidic pH (6.4). The average effective rooting depth is almost 16 inches with a layer of rocks encountered between 4 and 8 inches below the surface. The soil surface in the shrub interspaces is characterized by bare patches with concentrations of small rocks and pavement that appear to be of volcanic origin. Further erosion does not appear to be a problem on this site, with only localized soil movement being evident. The abundance of perennial grasses as well as their associated litter adequately protect the soil surface from severe erosion events.

Mountain big sagebrush is the dominant browse as it provides over 90% of the browse cover on the transect in all readings. Canopy cover of mountain big sagebrush was estimated at 13% in 2003. The population is moderately dense with an estimated 3,460 plants/acre in 1998 and 3,280 in 2003. This population has been characterized by moderate to high decadence and only fair recruitment. Percent decadence has ranged from 34-60% over the life of the transect with 47% of the population being classified as decadent in 2003. With such high levels of decadence it is not surprising that overall population density has steadily declined with each reading. In 2003, 44% of the decadent age class was classified as dying which equates to ~680 plants/acre that could be lost from the population by the next reading. Utilization has been moderate to heavy in all surveys, with the highest use being documented in 1987 and 1992. Some of the sagebrush plants have the growth form of the more erect but less preferred basin big sagebrush and are likely hybrids between the 2 subspecies. Additional evidence of hybridization comes from differential use throughout the site where some plants have received heavy use while others show light to no use. Sagebrush leaders had averaged 1.7 inches of growth when the site was read in mid-June of 2003. Additional palatable forage is provided by bitterbrush and squaw apple which are heavily browsed, but occur in very low densities on the site.

Pinyon and juniper trees are more prominent as you move south toward the hills. Point-center quarter data estimated 76 pinyon and 17 juniper trees/acre in 2003. Additional browse sampled on the site include mostly less preferred increasers such as low rabbitbrush, prickly phlox, and prickly pear cactus.

Perennial grasses are abundant and dominate the herbaceous understory. Two seeded species, crested wheatgrass and intermediate wheatgrass, are the most common species. Of the perennials, they have the highest nested frequency values in all years and combined to provide 70% of the grass cover in 1998 and 56% in 2003. Native perennials include Sandberg bluegrass, bottlebrush squirreltail, and needle-and-thread grass. Cheatgrass has steadily increased on the site with significant increases in nested frequency each reading since 1992. In 2003, the fire hazard resulting from the presence of cheatgrass on the site was not severe with an average cover of only 6%. However, further increases in frequency and cover of cheatgrass will elevate the threat of a wildfire that could eliminate the key browse, mountain big sagebrush. Further increases in cheatgrass will also be detrimental to seedling and young sagebrush plants which have a difficult time competing against cheatgrass for resources. Another negative factor is the continued increase of bulbous bluegrass, a low value short-lived perennial. The forb component is limited, and perennial species are insignificant on the site.

1987 APPARENT TREND ASSESSMENT

Ground cover percentages are typical for this type of site. Litter cover is good, and combined with basal vegetation, provides almost 60% of the total cover. Pavement and small rocks contribute prominently in the open areas. Exposed soil accounts for 17% of the ground surface and presents an erosion problem only in some of the larger bare areas. Heavy use, high decadence, and low biotic and reproductive potentials are a concern for mountain big sagebrush. This population will continue to decline. Grasses are adequately established but forbs are basically absent.

1992 TREND ASSESSMENT

Soil conditions appear stable. Some seasonal erosion is still occurring but it is not serious. Mountain big sagebrush has declined in density by 19% since 1987. It is also showing increased decadence. On the positive side, the proportion of plants displaying heavy hedging declined from 80% in 1987 to 40% in 1992. The population appears to be slowly declining with continued low biotic and reproductive potentials. Overall browse trend is slightly down. The herbaceous understory consists almost entirely of grasses. Perennial forbs are nearly absent. Combined summed nested frequencies of grasses and forbs (excluding the annuals which were not counted in 1987) have remained basically unchanged since the last reading indicating a stable trend.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - stable (3)

1998 TREND ASSESSMENT

The soil trend is slightly up with an increase in vegetation and litter cover. Although percent bare ground cover has slightly increased, the vegetative and litter cover are still adequate to protect the area from extensive runoff. The browse trend is continuing downward. The population has declined by 23% since 1992. It appears that the population may not be able to sustain itself at current levels. The herbaceous understory trend is slightly upward. Perennial herbaceous species sum of nested frequency has increased slightly since 1992 from 403 to 446. One positive aspect is continued high cover values for crested wheatgrass and intermediate wheatgrass. These relatively higher cover values will help keep cheatgrass in check. Although cheatgrass nested frequency significantly increased, the cover values stayed nearly the same.

TREND ASSESSMENT
soil - slightly up (4)
browse - slightly down (2)
herbaceous understory - slightly up (4)

2003 TREND ASSESSMENT

Trend for soil is slightly down as litter cover declined and bare ground increased. Erosion remains low, but the ratio of protective cover (vegetation, litter, and cryptogams) to bare soil declined. Trend for browse is slightly down. Mountain big sagebrush continues to decline in density although at a slower rate than in previous surveys. The sagebrush population has increased decadence, and 44% of the decadent plants sampled in 2003 were classified as dying. The proportion of young in the population continues to decline, and poor vigor and heavy use showed slight increases in 2003. If cheatgrass continues to increase, the big sagebrush population will be negatively effected in 2 ways. First, the threat of a wildfire will increase, and second, seedling and young plants will have a difficult time competing for resources. Trend for the herbaceous understory is stable. Perennial grasses and forbs slightly declined in sum of nested frequency, but not enough to warrant a downward trend. Cheatgrass continues to increase and may soon dominate the site if this trend continues.

TREND ASSESSMENT
soil - slightly down (2)
browse - slightly down (2)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Management unit 28 , Study no: 8

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
G	Agropyron cristatum	b144	ab111	ab132	a97	6.79	10.14	5.32
G	Agropyron intermedium	a133	b168	a120	ab146	8.02	5.08	5.65
G	Aristida purpurea	-	-	-	-	-	.15	.00
G	Bromus inermis	b21	ab16	ab18	a5	.25	.21	.06
G	Bromus tectorum (a)	-	a124	b194	c261	2.26	2.14	5.69
G	Oryzopsis hymenoides	6	9	5	2	.21	.04	.03
G	Poa bulbosa	a-	b7	c77	d94	.10	1.10	1.67
G	Poa secunda	a-	ab4	ab12	b15	.02	.07	.25
G	Sitanion hystrix	ab29	ab46	b56	a26	1.90	2.02	.55
G	Stipa comata	b53	ab30	a13	a14	.69	.72	.37
Total for Annual Grasses		0	124	194	261	2.26	2.14	5.69
Total for Perennial Grasses		386	391	433	399	18.00	19.54	13.92
Total for Grasses		386	515	627	660	20.27	21.69	19.61
F	Agoseris glauca	-	-	-	2	-	-	.00
F	Alyssum alyssoides (a)	-	-	1	1	-	.00	.00
F	Astragalus spp.	-	-	4	-	-	.06	-
F	Chaenactis douglasii	1	-	2	-	-	.01	-
F	Cruciferae	-	9	4	-	.04	.01	-
F	Draba spp. (a)	-	-	1	-	-	.00	-
F	Eriogonum cernuum (a)	-	6	-	-	.39	-	-
F	Gayophytum ramosissimum(a)	-	-	-	7	-	-	.02
F	Microsteris gracilis (a)	-	a-	a8	b35	-	.02	.10
F	Orobanche fasciculata	-	-	2	-	-	.00	-
F	Phlox longifolia	-	-	-	3	-	-	.00
F	Polygonum douglasii (a)	-	1	4	-	.00	.01	-
F	Ranunculus testiculatus (a)	-	a-	b12	c47	-	.03	.21
F	Streptanthus cordatus	-	-	-	3	-	-	.00
F	Taraxacum officinale	-	3	1	3	.00	.00	.01
F	Unknown forb-annual (a)	-	b40	a-	a-	.11	-	-
F	Unknown forb-perennial	1	-	-	-	-	-	-

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
Total for Annual Forbs		0	47	26	90	0.50	0.07	0.34
Total for Perennial Forbs		2	12	13	11	0.04	0.08	0.02
Total for Forbs		2	59	39	101	0.55	0.15	0.36

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 28 , Study no: 8

Type	Species	Strip Frequency			Average Cover %		
		'92	'98	'03	'92	'98	'03
B	Artemisia tridentata vaseyana	90	85	79	16.55	13.69	16.11
B	Chrysothamnus viscidiflorus	1	0	0	.00	-	-
B	Juniperus osteosperma	0	2	1	.03	.93	.15
B	Leptodactylon pungens	11	7	7	.25	.27	.24
B	Opuntia spp.	3	0	0	-	-	-
B	Peraphyllum ramosissimum	0	1	1	-	-	-
B	Pinus edulis	0	0	0	-	-	.00
Total for Browse		105	95	88	16.84	14.90	16.51

CANOPY COVER, LINE INTERCEPT --
Management unit 28 , Study no: 8

Species	Percent Cover '03
Artemisia tridentata vaseyana	12.75

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 28 , Study no: 8

Species	Average leader growth (in) '03
Artemisia tridentata vaseyana	1.6

POINT-QUARTER TREE DATA --
Management unit 28 , Study no: 8

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	40	17
Pinus edulis	20	7

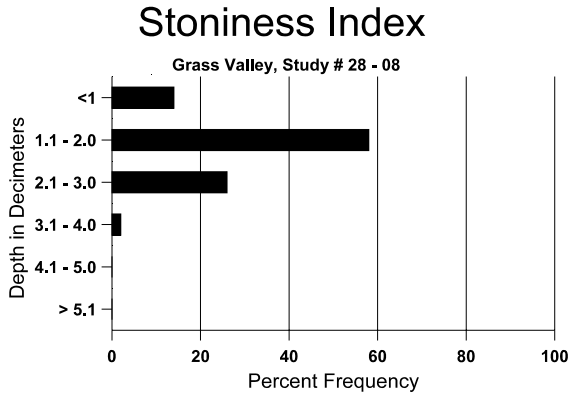
Average diameter (in)	
'98	'03
3.4	1.6
4.7	1.3

BASIC COVER --
Management unit 28 , Study no: 8

Cover Type	Average Cover %			
	'87	'92	'98	'03
Vegetation	4.75	32.46	37.59	35.54
Rock	3.00	1.86	3.20	3.13
Pavement	21.25	23.52	20.40	11.61
Litter	54.25	31.47	48.00	34.69
Cryptogams	0	.16	.47	.10
Bare Ground	16.75	16.85	21.84	28.43

SOIL ANALYSIS DATA --
Management unit 28, Study no: 8, Study Name: Grass Valley

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
15.9	69.6 (12.4)	6.4	60.7	20.7	18.6	1.7	9.4	192.0	0.4



PELLET GROUP DATA --
Management unit 28 , Study no: 8

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Sheep	1	-	-	-
Rabbit	48	30	-	-
Elk	-	1	1 (2)	1 (3)
Deer	46	30	61 (151)	57 (141)
Cattle	3	3	9 (22)	11 (27)

BROWSE CHARACTERISTICS --
Management unit 28 , Study no: 8

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata vaseyana											
87	**5533**	66	200	2533	2800	-	20	80	51	11	20/20
92	**4480**	240	300	1480	2700	-	41	40	60	16	-/-
98	**3460**	100	320	1960	1180	1080	47	3	34	5	25/35
03	**3280**	-	80	1660	1540	1060	35	24	47	21	22/29
Chrysothamnus viscidiflorus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
92	**20**	-	20	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Juniperus osteosperma											
87	**66**	-	-	66	-	-	0	0	-	0	57/39
92	**0**	40	-	-	-	-	0	0	-	0	-/-
98	**40**	20	-	40	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	35/11
Leptodactylon pungens											
87	**0**	-	-	-	-	-	0	0	0	0	-/-
92	**920**	20	160	760	-	-	11	9	0	4	-/-
98	**320**	-	-	320	-	-	0	0	0	0	6/9
03	**300**	-	-	260	40	-	0	0	13	7	6/8

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Opuntia spp.											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
92	**60**	-	-	60	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	3/7
Peraphyllum ramosissimum											
87	**133**	-	-	-	133	-	0	100	100	0	-/-
92	**0**	-	-	-	-	-	0	0	0	0	-/-
98	**20**	-	-	20	-	-	0	100	0	0	25/22
03	**20**	-	-	20	-	-	0	100	0	0	27/40
Pinus edulis											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
92	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	20	-	-	-	-	0	0	-	0	-/-
Purshia tridentata											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
92	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	42/81